Emotion regulation and aggression

Garofalo, C.; Velotti, Patrizia; Zavattini, Giulio Cesare

Published in:
Psychology of Violence

DOI:
10.1037/vio0000141

Publication date:
2018

Document Version
Peer reviewed version

In press, *Psychology of Violence*

Emotion Regulation and Aggression:

The Incremental Contribution of Alexithymia, Impulsivity, and Emotion Dysregulation Facets

Carlo Garofalo

Tilburg University

Patrizia Velotti

University of Genoa

Giulio Cesare Zavattini

Sapienza University of Rome

Author note

Carlo Garofalo, Department of Developmental Psychology, Tilburg University, The Netherlands; Patrizia Velotti, Department of Educational Sciences, University of Genoa, Italy; Giulio Cesare Zavattini, Department of Dynamic and Clinical Psychology, Sapienza University of Rome, Italy

Correspondence concerning this article should be addressed to **Carlo Garofalo**, Department of Developmental Psychology, Tilburg University, P.O. Box: 90153, 5000 LE Tilburg, The Netherlands.

E-mail: c.garofalo@uvt.nl

Abstract

Objective: Prior research has long emphasized the role of alexithymia and impulsivity to explain aggressive tendencies. Recently, a growing body of research seems to support the relevance of the broader construct of emotion dysregulation to understand aggression. The present study was the first to comprehensively examine the relative contribution of, and the mechanisms linking alexithymia, impulsivity, and emotion dysregulation in predicting aggression dimensions. *Method*: Male violent offenders (N = 221) and community participants (N = 245) completed multifaceted self-report measures of alexithymia, impulsivity, emotion dysregulation, and aggression. Regression analyses tested the independent contribution of each facet on aggression dimensions. Bootstrap analyses examined the indirect effect of alexithymia on aggression through emotion dysregulation and impulsivity. *Results*: Offenders reported higher levels of difficulties identifying feelings, emotional nonacceptance, physical aggression, and hostility. Difficulties in identifying and describing feelings, and motor and attentional impulsivity, explained unique variance in physical aggression, anger, and hostility in both samples, and also in verbal aggression among community participants. In both samples, negative urgency and emotional nonacceptance explained additional variance in aggression dimensions above and beyond the influence of alexithymia and impulsivity. Emotion dysregulation and impulsivity mediated the relation between alexithymia and aggression in both samples, with emotion dysregulation demonstrating a relatively stronger effect. *Conclusions:* Findings emphasize the unique relevance of alexithymia, impulsivity, and emotion dysregulation facets in explaining aggressive tendencies. Clinical implications include the importance of focusing on emotion regulation skills – such as accepting emotions and do not act on them – to reduce aggression tendencies.

Keywords: violence, anger, hostility, offenders, negative urgency

Emotion Regulation and Aggression:
The Incremental Contribution of Alexithymia, Impulsivity, and Emotion Dysregulation Facets

Understanding the psychological mechanisms underlying aggressive behavior has historically been an important scientific endeavor (Anderson & Bushman, 2002; Nestor, 2002). From a developmental perspective, aggression is considered an innate human predisposition that can serve adaptive and maladaptive purposes (Fonagy, 2003; Nagin & Tremblay, 2001). As such, the destructive manifestation of aggressive tendencies can be understood in terms of impairments in those processes that normally regulate and channel aggression toward adaptive goals (e.g., survival or genuine protest against injustice; Fonagy, 2003). Within the realm of individual differences that can account for increased levels of aggression, in the last decades the psychological literature has witnessed an exponential increase of theories and studies focusing on self-regulation (Anderson & Bushman, 2002; Denissen, Thomaes, & Bushman, 2017) or mentalization (Fonagy, 2003). Specifically, studies on adult aggression have emphasized the role of alexithymia (i.e., inability to identify and describe feelings), impulsivity, and in more recent years emotion dysregulation (Garofalo & Wright, 2017; Roberton, Daffern, & Bucks, 2012). However, despite the multifaceted nature and the moderate overlap among alexithymia, impulsivity and emotion dysregulation, there is a lack of studies including these three different – albeit related – constructs simultaneously, to examine the independent contribution of each of their facets in explaining aggression dimensions. Moreover, there is a need to further our understanding of possible mechanisms linking alexithymia, impulsivity, and emotion dysregulation with aggression. In the current study, we sought to advance current knowledge in this area by examining: the independent contribution of alexithymia, impulsivity, and emotion dysregulation facets in explaining aggressive tendencies (i.e., physical and verbal aggression, anger, and hostility; Buss & Perry, 1992); the possible indirect effect of alexithymia on aggressive tendencies through the mediating role of emotion dysregulation and impulsivity.

An increasing body of theoretical (Davidson, Putnam, & Larson, 2000; Day, 2009; Roberton et al., 2012) and empirical works (Garofalo & Velotti, 2017; Roberton, Daffern, & Bucks, 2015) are indeed suggesting that a greater knowledge on the role of emotion regulation in aggression may be invaluable both to refine etiological models of offending and to improve existing treatments for offenders. Some authors went so far as to posit that emotion regulation represents a ‘prelude to violence’ (Davidson et al., 2000). The clinical

and empirical literature also suggests that one possible limit of existing treatment programs is the exclusive focus on the control of emotions. While certainly relevant, such approach seems to be heavily focused on a traditional view of negative emotions as something bad that need to be tamed, in turn neglecting the potential importance of other aspects of the broader emotion regulation construct, such as the ability to let emotions unfold acknowledging their adaptive value (Day, 2009; Roberton et al., 2015). Actually, recent advances in emotion research have suggested that emotions are not inherently good or bad, but are functional in the sense that they provide information about the self and about how people are doing in their environment (e.g., Bonanno & Burton, 2013; Tamir, 2011). However, the possibility that also negative emotions can be adaptive if aptly regulated has relatively been neglected in forensic psychology until recent years, and a broader focus on the regulation of negative emotional experience can provide important information for clinical work with violent offenders (Roberton et al., 2015).

Alexithymia and Aggression

Alexithymia is characterized by impairments in the ability to identify and describe feelings, often accompanied by reduced introspection (i.e., an externally oriented thinking style; Nemiah & Sifneos, 1970). From a theoretical standpoint, the link between alexithymia and aggression is typically understood considering the ability to reflect and talk about feelings as a protective factor for aggression (Fonagy, 2003; Levenson, 1999). Impairments in this ability (which is part of the broader concept of mentalization; Fonagy, 2003) would therefore increase the risk of resorting to maladaptive behavioral strategies in response to frustration, including externalizing behaviors such as aggression (Fonagy, 2003; Fossati et al., 2009). In line with this assumption, a recent daily diary study showed that levels of emotional differentiation (i.e., ability to differentiate and describe discrete emotions) moderated the link between the experience of anger and aggressive behavior, such that the anger-aggression link was stronger at low levels of emotional differentiation (Pond et al., 2012). Further, several studies have provided indirect support for the relevance of alexithymia to understand aggression and offending, reporting greater levels of alexithymia among violent offenders, compared to non-offenders (Keltikangas-Järvinen, 1982; Manninen et al., 2011; Teten, Miller, Bailey, Dunn, & Kent, 2008).

Recent studies have documented significant associations between alexithymia and different indices of aggression across various populations, including community samples (Fossati et al., 2009), psychiatric

inpatients (Velotti, Garofalo, Petrocchi, et al., 2016), violent offenders (Roberton, Daffern, & Bucks, 2014; Velotti, Garofalo, Callea, et al., 2016), and forensic patients (Hornsveld & Kraaimaat, 2012). At a facet-level, a difficulty in identifying feelings and externally oriented thinking have been associated with aggression, and in one study difficulty identifying feelings mediated the effect of attachment insecurities on aggression (Fossati et al., 2009). Of note, in two studies, the association that alexithymia had with anger expression and aggression dropped to non-significance after accounting for levels of emotion dysregulation (Edwards & Wupperman, 2016; Velotti, Garofalo, Callea, et al., 2016). Overall, these findings appear to provide consistent support for a positive association between alexithymia and aggression, especially concerning a difficulty in identifying feelings, though prior studies have not examined different aspects of aggression (e.g., hostility). Further, it remains unclear whether this relation is specific to alexithymia or is due to its shared variance with emotion dysregulation, and whether – rather than a direct effect – alexithymia may exert an indirect contribution on aggression through mediating factors, such as impulsivity and emotion dysregulation (Fonagy, 2004).

Impulsivity and Aggression

Impulsivity is a personality trait characterized by a tendency toward rapid, unplanned reactions to internal or external stimuli without concern for the negative consequences of these reactions for one's self and others (Hamilton et al., 2015; Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). The construct of impulsivity involves a cognitive component – defined by attentional deficits and failure to process contextual information – and a behavioral component – characterized by an inability to inhibit rash actions and delay gratification (Schmidt, Fallon, & Coccaro, 2004). Impulsivity further includes a general tendency to live on the spur of the moment, that is, without a careful planning of short- and long-term life goals (Patton, Stanford, & Barratt, 1995). Poor impulse control has long been considered a risk factor for aggressive behavior, especially among individuals with antisocial personality traits (Nestor, 2002). Seminal studies have documented that impulsivity and aggression have a moderate association, which may be explained by shared genetic and environmental influences (Seroczynski, Bergeman, & Coccaro, 1999), as well as by a common temperamental disposition for irritability (Coccaro, 1992).

Despite the conceptual overlap between impulsivity and aggression (Berkowitz, 1993), only in the last decade has their association received substantial empirical scrutiny. Moderate associations between trait

aggression and both cognitive and behavioral impulsivity have been reported among psychiatric patients (Fossati et al., 2007; Velotti, Garofalo, Petrocchi, et al., 2016). Further, studies with non-clinical samples reported consistent findings linking impulsivity facets (e.g., lack of premeditation, lack of perseveration, sensation seeking) and indices of aggression (Derefinko, DeWall, Metze, Walsh, & Lynam, 2011; Hecht & Latzman, 2015; Lynam & Miller, 2004; Miller, Zeichner, & Wilson, 2012). Moreover, two recent studies showed that impulsivity significantly predicted both trait aggression and actual episodes of aggressive behaviors among forensic patients (Bousardt, Hoogendoorn, Noorthoorn, Hummelen, & Nijman, 2016; Tonnaer, Cima, & Arntz, 2016). Although evidence linking both behavioral and cognitive impulsivity with aggression seems compelling, more studies are needed to examine if impulsivity may explain the association between alexithymia and different aggression dimensions. Further, it remains unclear whether impulsivity explains unique variance in aggression dimensions, after accounting for variability in related constructs, such as emotion dysregulation.[1] For instance, in two recent studies, impulsivity did show a positive association with aggression, but its mediating effect in the relation between borderline personality traits and aggression dropped to non-significance when emotion dysregulation was included as simultaneous mediator (L. N. Scott, Stepp, & Pilkonis, 2014; Terzi et al., 2017).

Emotion Dysregulation and Aggression

A recent and influential conceptualization defines emotion dysregulation as encompassing impairments in one or more of the following related domains: emotional awareness (defined as a tendency to attend to and acknowledge the importance of emotions); emotional clarity; emotional acceptance; the ability to rely on effective emotion regulation strategies; the ability to engage in goal-directed behavior when distressed (i.e., distress tolerance); and the ability to control behavior when distressed, that is, negative urgency (Gratz & Roemer, 2004). Adopting this conceptualization, an increasing amount of studies have been accumulating over

[1] It should be emphasized that some of the studies reviewed above have used self-report measure of impulsivity that includes a subscale assessing negative urgency (i.e., inability to control behavior when distressed). Negative urgency is by definition a form of impulsive behavior stemming from the inability to deal with negative emotional arousal, and is therefore intimately linked to emotion dysregulation (Cyders & Smith, 2008). As such, negative urgency is also included in popular conceptualizations and measures of emotion dysregulation (e.g., Gratz & Roemer, 2004). Although one study did report associations between aggression and a measure of impulsivity that did not include negative urgency (Fossati et al., 2007), further studies seem needed to examine whether the relation between impulsivity and aggression would hold after partialling out the variance associated with negative urgency scores.

the last few years, linking emotion dysregulation with aggression tendencies in different populations (Garofalo, Holden, Zeigler-Hill, & Velotti, 2016; Roberton et al., 2014, 2015; J. P. Scott, DiLillo, Maldonado, & Watkins, 2015; Velotti, Garofalo, Callea, et al., 2016). At a facet-level, negative urgency, emotional nonacceptance, poor emotional awareness, and limited access to emotion regulation strategies seemed consistently associated with aggression (Garofalo et al., 2016; Roberton et al., 2015; J. P. Scott et al., 2015)

These findings were consistent with theoretical expectations, according to which aggression can be understood as an attempt to externalize unwanted emotions, in the absence of adaptive ways to deal with them (Elison, Garofalo, & Velotti, 2014; Roberton et al., 2012). The emotion dysregulation-aggression link may manifest in different ways. On the one hand, in the form of a tendency to over-react to perceived threats, that is, with aggressive behavior that are strongly emotion-laden (Roberton et al., 2012). On the other hand, some individuals can cope with their inability to regulate emotions by detaching from (or numbing) their emotional experience, a feature that is associated with aggressive tendencies such as interpersonal dominance and hostility (Keulen-de Vos et al., 2016; Velotti, Elison, & Garofalo, 2014). Overall, the consistency of findings linking emotion dysregulation and aggression seems rather convincing. However, little is known about whether these findings are merely a replication of results obtained with measures of alexithymia and impulsivity, or whether such a comprehensive assessment of emotion dysregulation adds to our understanding of aggression. This possibility seems supported by studies showing the independent contribution of emotion dysregulation on aggression, above and beyond the influence of alexithymia (Edwards & Wupperman, 2016; Velotti, Garofalo, Callea, et al., 2016) and impulsivity (L. N. Scott et al., 2014; Velotti, Garofalo, Petrocchi, et al., 2016). However, no studies that we are aware of have tested the incremental contribution of emotion dysregulation beyond the influence of both alexithymia and impulsivity among offenders.

Emotion Dysregulation and Impulsivity as Mediators of the Alexithymia-Aggression Link

According to the developmental perspective mentioned above, the capacity to establish a second order representation of emotions (that is, to translate emotional arousal in psychological concepts that can be described in words) is supposed to create the basis for emotion regulation and impulse control, constituting an essential building block for adaptive behavior (Fonagy, 2004). Therefore, it is plausible that when this capacity is limited (as in the presence of alexithymia), problems with emotion regulation and impulse control may

increase, likely contributing to greater levels of aggression (Fonagy, 2003, 2004). Impairments in these processes are indeed at the core of Fonagy's (2003) mentalization framework of violence. Accordingly, in a recent study, emotion dysregulation mediated the effect of alexithymia (operationalized as poor emotional differentiation) on aggression among college students (Edwards & Wupperman, 2016). Yet, to date only one study has examined the possible mediating role of both emotion dysregulation and impulsivity in the relation between alexithymia and aggression. Results showed that emotion dysregulation (specifically, negative urgency) and both behavioral and cognitive impulsivity mediated the association between alexithymia and aggression in both a community and a psychiatric sample, though effect sizes were relatively stronger for emotion dysregulation (Velotti, Garofalo, Petrocchi, et al., 2016). However, that study only looked at overall levels of aggression, conflating scores of different dimensions, such as physical aggression, anger, and hostility. Further, it remains uncertain whether such findings would replicate in more severely aggressive populations, including violent offenders.

The Present Study

Elaborating on the theoretical and empirical work reviewed above, we sought to confirm and extend prior knowledge by examining the independent contribution of alexithymia, impulsivity, and emotion dysregulation facets in explaining individual differences in aggression dimensions (i.e., physical and verbal aggression, anger, and hostility). Further, we tested whether alexithymia had an indirect effect on aggression dimensions through the mediating role of emotion dysregulation and impulsivity. In an effort to increase the robustness and generalizability of findings across populations characterized by different degrees of severity of aggression, the present study involved a sample of male incarcerated violent offenders as well as male individuals dwelling in the community. In light of prior studies (e.g., Fossati et al., 2009; Garofalo et al., 2016; Roberton et al., 2015), we formulated the following hypotheses:

Hypothesis 1: We expected that alexithymia, impulsivity, and emotion dysregulation facets would explain unique variance in the four aggression dimensions. Specifically, we expected that a difficulty in identifying feelings and both behavioral and cognitive impulsivity would emerge as independent predictors of aggression. Further, we expected that emotion dysregulation facets (i.e., negative urgency, emotional

nonacceptance, poor emotional awareness, and limited emotion regulation strategies), explained incremental variance in aggression above and beyond the influence of alexithymia and impulsivity.

Hypothesis 2: We expected that both emotion dysregulation and impulsivity would mediate the association between alexithymia and the four aggression dimensions considered, with a relatively stronger effect for emotion dysregulation. Specifically, considering the emotional nature of the anger component, we expected that the mediating effect of emotion dysregulation was stronger in predicting anger.

Method

Participants and Procedures

The offender sample included 221 male Italian inmates (M_{age} = 40.9, *SD* = 9.40). All inmates were serving sentence for violent crimes (i.e., offenses involving physical violence toward others) in Italian prisons in the area around three large Italian cities (i.e., Rome, Milan, and Genoa). Types of crime were distributed as follows: aggravated robbery (27.3%), murder (22.5%), serious physical assault (13%), sexual offense (12.1%), and minor repeated physical assaults (9.5%). The community sample consisted of 245 Italian male participants (M_{age} = 38.9, *SD* = 10.1). Community-dwelling participants were recruited via self-referrals in response to advertisements asking potential volunteers for psychological studies. Community participants were recruited from urban, suburban, and semi-rural areas in the Rome metropolitan area. For both samples, adult men aged between 25 and 60 years and of Italian nationality were eligible to participate. Participants were excluded if they had a major psychiatric disorder or if they had suffered from alcohol or drug intoxication leading to loss of consciousness in the last 3 months (no cases were reported). A summary of the sociodemographic characteristics of participants in both samples is reported in Table 1. All participants completed the assessment in individual or small group sessions. For the inmates, these sessions were scheduled in quiet rooms where inmates usually met with prison educators. For inmates, the small group sessions were preferred to individual sessions – when possible – in order to limit the burden on prison staff members who have to stay near the assessment room for security reasons. Two researchers were always present in the room to make sure that participants did not communicate with each other while filling out the questionnaires. All participants provided written informed consent to voluntarily take part in the research. Participants did not receive any compensation, and were informed that they could withdraw at any time from the study. Offenders were also

assured that their decision to participate would not have any influence on their inmate status. The Ethics Review Board of Sapienza University of Rome and the Italian Ministry of Justice formally approved all procedures.

[Insert table 1 about here]

Measures

Alexithymia. The Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994) was used to measure individual differences in levels of alexithymia. The TAS-20 is a widely used self-report measure of alexithymia and has demonstrated adequate reliability and validity in both its original version and in the Italian adaptation (Bressi et al., 1996) that was used in the present study. The TAS-20 contains 20 items, and respondents had to rate each statement on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. The TAS-20 taps onto three interrelated dimensions: difficulty identifying feelings (DIF, α = .82; e.g., "I am often confused about what emotion I am feeling"), difficulty describing feelings (DDF, α = .72; e.g., "It is difficult for me to find the right words for my feelings"), and external oriented thinking (EOT, α = .50; e.g., "I prefer talking to people about their daily activities rather than their feelings"). Subscale scores are summed to produce an overall alexithymia score (α = .79), with higher scores indicating greater alexithymia.

Impulsivity. Trait impulsivity was assessed using the Barratt Impulsiveness Scale-11 (BIS-11; Patton et al., 1995), which consists of 30 items rated on a 4-point Likert scale. Respondents had to rate the extent to which each item applied to them ranging from *never/rarely* to *almost always/always*. The BIS-11 has demonstrated adequate reliability and validity, and its psychometric properties have been confirmed in the Italian adaptation used in this study (Fossati, Di Ceglie, Acquarini, & Barratt, 2001). The BIS-11 comprises three subscale capturing: the tendency to act on the spur of the moment (Motor Impulsivity, α = .67; e.g., "I act on impulse"); the inability to focus on tasks at hand and the tendency to be easily distracted (Attentional Impulsivity, α = .61; e.g., "I get easily bored when solving thought problems"); the tendency to make decisions without careful forethought and self-control (Non-planning Impulsivity, α = .66; e.g.; "I do things without thinking"). Subscale scores can be summed to obtain the BIS-11 total score (α = .81) as an index of overall trait impulsiveness. Greater scores indicate higher levels of impulsivity.

Emotion Dysregulation. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was used to assess self-report emotion regulation problems. Previous research has found the DERS – and the Italian translation used in this study (Giromini, Velotti, de Campora, Bonalume, & Zavattini, 2012) – to have good psychometric properties and construct validity (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). Participants had to indicate each of the 36 items how often each statement applied to them on a 5-point Likert scale ranging from *almost never* to *almost always*.The DERS measures six dimensions of emotion dysregulation: nonacceptance of emotional responses (Nonacceptance, α = .83; "When I'm upset, I feel ashamed with myself for feeling that way"); difficulties engaging in goal-directed behavior when distressed (Goals, α = .81; "When I'm upset, I have difficulty getting work done"); negative urgency, that is, difficulties controlling behavior under negative emotional arousal (Negative Urgency[2], α = .82; "When I'm upset, I become out of control"); poor emotional awareness (Awareness, α = .64; "When I'm upset, I acknowledge my emotions"); inability to engage in effective emotion regulation strategies (Strategies, α = .87; "When I'm upset, I believe that there is nothing I can do to make myself feel better"); and poor emotional clarity (Clarity, α = .79; "I am confused about how I feel"). All items are summed to compute a composite score of overall emotion dysregulation (α = .92), and higher scores indicate greater emotion dysregulation.

Aggression. Trait aggression was measured with the Aggression Questionnaire (AQ; Buss & Perry, 1992). The AQ is a reliable and valid self-report questionnaire commonly used to assess aggressive tendencies. In the present study, the Italian adaptation of the AQ was used (Fossati, Maffei, Acquarini, & Di Ceglie, 2003), which demonstrated good psychometric properties. Participants had to rate each item by indicating how much each statement was characteristic of them on a Likert scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). The AQ contains 29 items and measures four subscales: Physical Aggression (α = .80; e.g., "Once in a while I can't control the urge to strike another person"); Verbal Aggression (α = .61; e.g., "I can't help getting into arguments when people disagree with me"); Anger (α = .72; e.g., "I sometimes feel like a powder keg ready to explode"); and Hostility (α = .76; e.g., "When people are

[2] This scale of the DERS is often labeled Impulse. However, we preferred to use the label Negative Urgency to avoid confusion with the impulsivity scores assessed with the BIS-11. As mentioned in the introduction, some impulsivity measures also include subscales measuring negative urgency, a construct that likely lies at the border between emotion dysregulation and impulsivity.

especially nice, I wonder what they want"). A total AQ composite score (α = .89) is calculated summing all subscales (though the AQ total score was not used in the present study), with greater scores indicating higher levels of trait aggression.

Psychopathological Distress. To control for the potential confounding effect of current symptoms, the Global Severity Index (GSI) of the Italian version (Zavattini et al., 2017) of the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used. The BSI items measure the presence and severity of psychological symptoms over the past 30 days, including somatization, interpersonal sensitivity, depression, anxiety, and psychoticism. Items are rated on a Likert scale ranging from 0 (*not at all*) to 4 (*extremely*), with higher scores indicating greater severity. The GSI score (α = .97) is calculated summing scores on all items.

Data Analysis[3]

Descriptive statistics and zero-order correlation were computed for all study variables. An independent sample *t*-test was used to examine age differences across groups. Univariate and multivariate analysis of variance and covariance (ANOVA/MANOVA and ANCOVA/MANCOVA, respectively) were conducted to examine group differences on all study variables, controlling for possible covariates when appropriate. In these analyses, Partial Eta Squared (η^2_p) was used as measure of effect size. Hierarchical multiple regression analyses were employed to measure the independent contribution of the three TAS-20 subscales (Step 1), the three BIS-11 subscales (Step 2), and the six DERS subscales (Step 3), in predicting aggression dimensions. A bootstrap approach (Preacher & Hayes, 2008) was used to test the significance of the indirect effect of alexithymia on aggression through the mediating role of emotion dysregulation and impulsivity. The SPSS PROCESS Macro (Hayes, 2013) was used to conduct multiple mediation analyses, computing 5,000 bootstrap resampling with replacement from the original dataset to estimate 95% confidence intervals (*CIs*) for the

[3]Although we use the terms 'prediction' and 'mediation' as they are often used in cross-sectional studies (Hayes, 2013; Preacher & Hayes, 2008), we by no means use them to imply causal or temporal relationships among study variables. Rather, we refer to these terms as statistical predictions and mediations based on cross-sectional associations (sometimes referred to as 'atemporal'; see Winer et al., 2016). Regression analyses allowed us to examine which independent variables showed an independent contribution (i.e., controlling for the shared variance among predictors) to the model explaining variance in aggression dimensions. Mediation analyses were used to examine whether a portion of the shared variance between alexithymia and aggression dimensions was significantly accounted for by emotion dysregulation and impulsivity. As in regression analyses, including both mediators in the same model allowed us to statistically remove the shared variance between mediators, as well as between the mediators and the dependent variable.

indirect effects (*CIs* that do not include zero indicate a significant indirect effect). For the sake of parsimony, mediation models were run including TAS-20, DERS, and BIS-11 total scores, predicting each of the AQ subscales. This method allowed to statistically compare the relative strength of the single indirect effects, by calculating the significance of the point estimate for the difference between pairs of mediators and their 95% *CIs*. The completely standardized indirect effect (ab_{cs}; Preacher & Kelley, 2011) was used as a measure of effect size.

Results

Participants in the community sample were significantly, albeit slightly, younger than participants in the offender sample, $t(463.4) = 2.27$, $p < .05$. Therefore, all subsequent analyses were repeated holding constant the effect of age, and results remained virtually unchanged. Table 1 shows descriptive statistics and group comparisons for all study variables. The offender sample reported significantly greater scores than community participants on the AQ Physical Aggression, Hostility, and total scores. No significant differences between the two samples occurred on the TAS-20, BIS-11, and DERS total score. However, offenders scored on average significantly higher than community participants on the DIF subscale of the TAS-20 and on the Nonacceptance scale of the DERS. Further, the offender sample reported significantly higher levels of psychopathological distress (GSI). All these group differences were significant also setting the significance value at $p < .025$ using the Bonferroni correction for multiple comparisons. Of note, effect sizes denoted that these differences were all small in magnitude.

[Insert Table 2 about here]

Inspection of the correlation matrix (Table 2) revealed that study variables were largely interconnected in both samples. The only exceptions worth noting concerned the Awareness scale of the DERS and the Verbal Aggression scale of the AQ, which were mostly uncorrelated with other variables. Partial correlations controlling for scores on the GSI revealed that only 22 of 240 correlation coefficients (9%) changed substantially. The TAS-20, BIS-11, DERS, and AQ total scores were all significantly correlated with each other, with r ranging between .34 (TAS-20/AQ in the community sample) and .65 (TAS-20/DERS in the offender sample).

[Insert Table 3 about here]

Regression analyses results are displayed in Table 3. Throughout all regression analyses, the Variance Inflation Factor (VIF) values never exceeded 2.8, indicating that multicollinearity did not bias regression results. In the offender sample, regression models were significant for physical aggression, anger, and hostility, roughly explaining 29%, 34%, and 27% of variance, respectively. For all these three models, all steps were significant, indicating that BIS-11 subscales significantly explained an additional portion of variance after accounting for TAS-20 subscales, and that DERS subscales significantly explained an amount of variance above and beyond TAS-20 and BIS-11 subscales. The following subscales emerged as independent predictors of the AQ dimensions. The DIF scale of the TAS-20, the Motor Impulsivity scale of the BIS-11, and the Negative Urgency scale of the DERS were significantly related to physical aggression. The DIF scale of the TAS-20, the Motor Impulsivity and Attentional Impulsivity scales of the BIS-11, as well as the Nonacceptance and Negative Urgency scales of the DERS were significantly related to anger. The DIF and DDF scales of the TAS-20, the Attentional Impulsivity scale of the BIS-11, and the Nonacceptance scale of the DERS were significantly related to hostility. All coefficients were positive, indicating that greater levels of alexithymia, impulsivity, and emotion dysregulation facets were associated with higher scores on aggression dimensions.

[Insert Table 4 about here]

In the community sample, regression models (Table 3) significantly explained a portion of variance in all AQ dimensions. In the models predicting scores on the Physical Aggression, Anger, and Hostility subscales of the AQ (28%, 41%, and 41% of variance explained, respectively), all steps were significant, indicating that BIS-11 subscales significantly explained an additional portion of variance after accounting for TAS-20 subscales, and that DERS subscales significantly explained an amount of variance above and beyond TAS-20 and BIS-11 subscales. The following subscales emerged as independent predictors of these AQ dimensions. The DIF scale of the TAS-20, the Motor Impulsivity and Attentional Impulsivity scales of the BIS-11, and the Negative Urgency scale of the DERS were significantly related to physical aggression. The DIF scale of the TAS-20, the Motor Impulsivity and Attentional Impulsivity scales of the BIS-11, and the Negative Urgency scales of the DERS were significantly related to anger. Levels of anger were also negatively related with the Clarity subscale of the DERS. The DIF and DDF scales of the TAS-20, the Attentional Impulsivity scale of the BIS-11, as well as the Nonacceptance, Negative Urgency, and Strategies scales of the DERS were significantly

related to hostility. With the exception of the association between emotional clarity and anger, all coefficients were positive, indicating that greater levels of alexithymia, impulsivity, and emotion dysregulation facets were associated with higher scores on aggression dimensions. In contrast with results in the offender sample, also the model predicting verbal aggression was significant among community participants, explaining 11% of variance. Although the step including TAS-20 subscales was not significant, in subsequent steps, the BIS-11 Attentional Impulsivity scale and the DERS Negative Urgency scale were significantly and positively associated with verbal aggression. Conversely, BIS-11 Non-planning Impulsivity scores were negatively related to verbal aggression. All regression analyses were repeated holding constant the effect of GSI scores, with no major changes noted.

[Insert Table 5 about here]

Results of mediation analyses in the offender sample are reported in Table 4. In line with regression results, the model involving verbal aggression was not statistically significant. Indirect effect results revealed that both DERS and BIS-11 total scores explained a significant portion of the variance shared by TAS-20 and the Physical Aggression scale of the AQ. Both indirect effects were medium in size, and the mediating effects of the DERS and BIS-11 did not differ significantly. Both DERS and BIS total scores significantly mediated the effect of TAS-20 scores on the Anger subscale of the AQ, though the effect was significantly stronger for DERS. Further, only the DERS significantly mediated the association between TAS-20 and the Hostility scale of the AQ. The direct effect of TAS-20 on AQ subscales after accounting for scores on the mediators was significant only in the model predicting hostility, evidencing that partial mediation occurred. Conversely, the mediators fully explained the association between alexithymia and both physical aggression and anger.

[Insert Table 6 about here]

Results of mediation analyses in the community sample are reported in Table 5. In line with regression results, all models were significant. Mediation results revealed that both DERS and BIS-11 total scores explained a significant portion of the variance shared by TAS-20 and the Physical Aggression scale of the AQ. Both indirect effects were small in magnitude. Both DERS and BIS total scores significantly mediated the effect of TAS-20 scores on the Anger subscale of the AQ, though the effect was significantly stronger for DERS. Finally, only the DERS significantly mediated the association between TAS-20 and the Verbal

Aggression and Hostility scale of the AQ, with medium and large effect sizes, respectively. In all models, the direct effect of TAS-20 on AQ subscales with the mediators included in the model was nonsignificant, indicating that full mediation occurred. All mediation analyses were repeated controlling for GSI scores, and results were virtually unchanged.

Discussion

The present study was among the first to examine the role of alexithymia, emotion dysregulation, and impulsivity facets – as well as their relations – in explaining aggression dimensions among violent offenders. Findings were largely consistent with the study hypotheses and serve the purpose of identifying potential targets for aggression treatments (Hamby, McDonald, & Grych, 2014). In short, some emotion dysregulation facets (i.e., negative urgency, emotional nonacceptance, and – to a lesser extent – limited emotion regulation strategies) explained incremental variance in all aggression dimensions, above and beyond the influence of alexithymia and impulsivity (*Hypothesis 1*). Further, emotion dysregulation consistently mediated the link between alexithymia and aggression, whereas – only partly conforming to the hypothesis – the mediating role of impulsivity was somewhat limited to physical aggression and, to a lesser extent, anger (*Hypothesis 2*).

Preliminary Findings: Facet-Level Group Differences and Bivariate Associations

Group comparisons highlighted the relevance of examining alexithymia, emotion dysregulation, impulsivity, and aggression at a facet level, in order to identify possible dysfunctions characterizing violent offenders. Indeed, overall levels of alexithymia, impulsivity, and emotion dysregulation did not differentiate offenders from non-offenders. However, offenders reported on average significantly greater levels of difficulty identifying feelings and emotional nonacceptance. This seems to indicate that offenders could be characterized by specific problems in understanding what they feel and in accepting their emotions when they are upset – that is, to let them unfold and decrease naturally rather than responding with a secondary emotional response (e.g., becoming angry for feeling sad). Of note, the finding concerning difficulties in identifying feelings (as measured with the TAS-20) was not coupled with differences in DERS-assessed emotional clarity. In this respect, it should be noted that the TAS-20 measures alexithymic features in general, whereas the DERS assesses emotion dysregulation difficulties in situations of distress. Therefore, it could be that offenders have trait-like difficulties in identifying their emotions, but are still able to do so when they are distressed (i.e., in

states of intense arousal). Partly surprisingly, offenders did not report greater levels on any impulsivity facet compared to non-offenders. However, as plausible, offenders did report greater levels of overall aggression, as well as of physical aggression and hostility. These results appear to suggest that offenders may not be characterized by greater levels of aggressive affect (i.e., anger). Rather, what characterizes offenders – along with a greater tendency to act aggressively – could be an antagonistic stance that involves the perception of others as malevolent and a proneness to respond with hostility (Garofalo et al., 2016). Overall, all group differences had relatively small effect size, as opposed to what is typically found comparing community participants with clinical samples (Fossati et al., 2007; Velotti, Garofalo, Petrocchi, et al., 2016), indicating that offenders showed less pervasive problems than individuals with full-blown psychiatric disorders. The finding that offenders did not report greater scores on the majority of the variable examined was partly unexpected. Although some prior studies have also reported similar levels of negative emotionality, alexithymia, and emotion dysregulation in offenders and community participants (e.g., Donahue, McClure, & Moon, 2014; Nicoll & Beail, 2013; Strickland, Parry, Allan, & Allan, 2017), the average levels of alexithymia, impulsivity, and emotion dysregulation in our offender sample was lower than those of most studies that have also used self-report measures of these constructs (e.g., Roberton et al., 2014). One possibility for this finding is that conflating in our violent offender sample individuals who have committed offenses that varied in terms of severity of violence may have masked more nuanced differences between community participants and certain offender groups (Perley-Robertons, Helmus, Derkzen, & Serin, 2016).

Bivariate associations were consistent with the expectations that the constructs examined were all well interwoven. That is, simple correlation analyses revealed that a substantial portion of variance was shared by alexithymia, emotion dysregulation, impulsivity, and aggression, both at the facet-level and in terms of overall scores. The general and rather uniform pattern of interconnections among these constructs may suggest that they represent lower-order reflections of a same higher-order (latent) construct defined by emotional and behavioral dysregulation or disinhibition (i.e., a broad externalizing dimension; Krueger et al., 2002). At the same time, this pattern of interconnections seems to support the potentially added value of examining the independent contribution of specific, narrower, constructs (or facets) in explaining unique variance in the

outcome of interest, such as aggression dimensions. This is especially true considering that group comparison results showed that significant differences occurred only at a facet-level.

Emotion Dysregulation Explains Aggression Dimensions Above and Beyond Alexithymia and Impulsivity

Regression analyses results appeared to confirm and extend previous studies highlighting: the importance of a facet-level analysis; the association between alexithymia and impulsivity to understand aggression; and the additional importance of the broader construct of emotion dysregulation. Notably, findings were largely consistent across groups, supporting the robustness of the associations that alexithymia, impulsivity, and emotion dysregulation facets had with aggression. Specifically, a difficulty in identifying feelings was associated with increased level of physical aggression, anger, and hostility. In addition, difficulties describing feelings were associated with hostility. These findings may indicate that a difficulty in monitoring and being aware of one's emotions could correspond to increased levels of anger experience and expression, hostile thoughts, and physically aggressive behavior. This is in line with previous studies (e.g., Fossati et al., 2009; Teten et al., 2008) and with theoretical expectations defining the ability to reflect and talk about feeling as a protective factor for aggression (Fonagy, 2003). Of note, the capacity to describe feelings could be specifically linked with a hostile cognitive style. For instance, without sharing one's feelings to others, it is more difficult to receive sympathetic responses, and it is therefore likely that others will be seen as unpredictable, or even hostile. At the same time, as in a vicious cycle, when others are deemed untrustworthy, revealing vulnerable states to them might be considered more harmful than helpful, in turn limiting the tendency to describe feelings.

In line with clinical accounts and prior findings (Nestor, 2002; Seroczynski et al., 1999), the behavioral component of impulsivity (i.e., motor impulsivity) was significantly associated with an increased tendency toward physical aggression and anger, explaining additional variance over and above the contribution of alexithymia. Furthermore, the cognitive component of impulsivity (i.e., attentional impulsivity) explained unique variance in anger and hostility (and in physical aggression, in the community sample only). These findings extended those of prior studies in non-offender populations (e.g., Fossati et al., 2007) emphasizing two important points. First, both behavioral and cognitive impulsivity may contribute to increased levels of

aggressive tendencies. Second, specific – rather than generic – associations may characterize the impulsivity-aggression link (Derefinko et al., 2011). Indeed, behavioral impulsivity seemed mainly related to physical aggression, whereas cognitive impulsivity was mainly related to hostility, that is, the cognitive component of aggression (Buss & Perry, 1992). Interestingly, both behavioral and cognitive impulsivity were related with anger, indicating that increased levels of the affective component of aggression may not only be linked with a tendency to behave impulsively, but also with cognitive deficits. It is indeed plausible to argue that individuals with higher levels of anger may also show difficulties in focusing on tasks at hand and may be easily distracted by peripheral stimuli, as anger has been associated with limited capacity to process salient and peripheral information (Baskin-Sommers et al., 2012).

Finally, in line with the *Hypothesis 1*, some emotion dysregulation facets explained incremental variance in aggression dimensions, suggesting that the broader construct of emotion dysregulation was not redundant with traits captured by measures of alexithymia and impulsivity, but can be of added value in explaining aggression. Specifically, negative urgency was related with physical aggression and anger (and, in the community sample, with hostility). Further, emotional nonacceptance was related to anger (only in the offender sample) and hostility. These findings replicate and extend those of prior studies (e.g., Garofalo et al., 2016; J. P. Scott et al., 2015), highlighting that the link between emotion dysregulation and aggression was not fully accounted for by alexithymia and impulsivity, and supporting the unique relevance of emotion dysregulation facets to understand aggression. Notably, the behavioral component of emotion dysregulation (i.e., negative urgency) seemed to be only partly overlapping with trait impulsivity, and able to explain additional variance in physical aggression and anger, the 'hot' dimensions of aggression. It is likely that a difficulty in refraining from acting out under negative emotional arousal may be partly independent from impulsivity, and related to tendencies to experience and express anger as well as to behave aggressively.

Also emotional nonacceptance was related to anger, but only among offenders. Therefore, it could be that offenders are more likely to turn unwanted emotions that they cannot tolerate (e.g., sadness, fear) into chronic feelings of anger. This finding fits nicely with the role of negative urgency, which could function as a behavioral bridge linking the experience of emotions that are not acceptable with the externalization of anger. Moreover, emotional nonacceptance was also related to hostility, indicating that this specific emotional

difficulty could be more intimately linked to the cognitive component of aggression than previously acknowledged. For example, it has been argued that individuals with difficulties in accepting negative emotions may tend to attribute their suffering to external causes, including specific people in their environment (Garofalo et al., 2016). In the community sample, hostility was also related to limited emotion regulation strategies, suggesting that also the inability to engage in effective strategies to regulate negative emotions may be related to a tendency to blame others for an emotional pain that is hard to soothe. However, further replications seem warranted in this respect.

Overall, the amount of variance explained in physical aggression, anger, and hostility, ranged approximately between 30% and 40%, indicating that a substantial portion of variability in aggressive tendencies can be understood in terms of emotional and behavioral dysregulation. Conversely, verbal aggression was related to emotion dysregulation and impulsivity only in the community sample, in line with prior claims that verbal aggression may represent a relatively more adaptive form of aggression compared to physical aggression (Buss & Perry, 1992; Garofalo et al., 2016). This could explain why verbal aggression was not related with maladaptive emotional and behavioral regulation among offenders, and why there was not significant difference between the two groups on verbal aggression. Further, non-planning impulsivity and poor emotional clarity were negatively related with verbal aggression and anger in the community sample. These unexpected results could have at least two explanation. Conceptually, it could indicate that the unique variance associated with those two variables has indeed a protective effect against aggressive tendencies. For instance, it could be that some verbally aggressive tendencies represent the externalization of negative emotions that are clearly identified. Statistically, and considering the weak association between those pairs of variable at the zero-order level, these negative coefficients may indicate the presence of a suppression effect. This occurs when removing the variance associated with variables mostly unrelated to the criteria, strengthens the associations between other significant predictors and the dependent variables (i.e., by removing noise from the equation).

One final remark concerning results of regression analyses should be emphasized. Considering the high degree of overlap among alexithymia, impulsivity, and emotion dysregulation facets emerged from correlation results, these findings should not be interpreted with the simplistic conclusion that only those facets related to

aggression in regression analyses are indeed associated with aggression dimensions. Regression results should be read as indicative of the fact that – even after removing what is shared – there are aspects that are specific to certain facets (e.g., difficulty identifying feelings, motor and cognitive impulsivity, negative urgency and emotional nonacceptance) that are able to explain unique variance in aggression dimensions. This is not equal to say that the other facets do not matter, as they actually share a non-negligible amount variance with aggression at the bivariate level. Rather, in light of the substantial overlap among facets, is much more likely that individuals with high levels of negative urgency also display difficulties in other domains of emotion dysregulation, alexithymia, and impulsivity. Therefore, findings obtained by statistically removing their shared variance are important to understand aggression from a conceptual standpoint, but do not imply that this shared variance does not exist, and this has important implications for clinical practice (see below). For instance, prior studies have highlighted the role of poor distress tolerance (operationalized here by the Goals subscale of the DERS) and poor emotional awareness in explaining anger and aggression in violent offenders (Roberton et al., 2014, 2015; Velotti, Garofalo, Callea, et al., 2016). Our findings are not inconsistent with these prior studies, and actually emphasize that the different facets of the broader emotion regulation construct are well intertwined and should not be treated in isolation.

Emotion Dysregulation and Impulsivity Mediate Associations Between Alexithymia and Aggression

The last aim of this study was to test the hypothesis that the association between alexithymia and aggression could be explained by emotion dysregulation and impulsivity (*Hypothesis 2*). This hypothesis was based on the assumption that the ability to identify and describe feelings constitutes an important building block for emotion regulation and impulse control (Fonagy, 2004). In both samples, findings were consistent with this developmental – mentalization-based – model. Despite the cross-sectional design of this study, mediation results shed some light on the mechanisms linking alexithymia, emotion dysregulation, and impulsivity, with aggression. Confirming and extending previous findings (Edwards & Wupperman, 2016; Velotti, Garofalo, Petrocchi, et al., 2016), emotion dysregulation and impulsivity explained the connection between alexithymia and aggression dimensions. Specifically, the effect of alexithymia on physical aggression was fully mediated by emotion dysregulation and impulsivity, with similar strength. This appears to indicate that the mechanisms linking alexithymia and physical aggression may actually be understood in terms of

problems in regulating emotions and impulsive behavior, likely stemming from difficulties in thinking and reflecting about feelings (Fonagy, 2004). In keeping with the hypotheses, the indirect effect of alexithymia on the affective component of aggression (i.e., anger) was mainly mediated by emotion dysregulation, though also impulsivity played a significant and non-trivial role. Interestingly, the link between alexithymia and hostility was only mediated by emotion dysregulation, indicating that the cognitive component of aggression may be more intimately related to impairments in emotion regulation, rather than to behavioral or cognitive dysfunctions. All results were strikingly similar across samples, supporting the robustness of the findings, and suggesting that similar mechanisms may link alexithymia, emotion dysregulation, impulsivity, and aggression in populations characterized by different degrees of violent behavior. Finally, in line with regression results, in the community sample alexithymia also had an indirect effect on verbal aggression, fully mediated by emotion dysregulation. This finding appears to indicate that – among relatively well-adjusted and non-violent individuals – a difficulty in identifying and describing feelings may contribute to a tendency to be verbally assaultive and offensive, explained by difficulties in regulating emotions.

Limitations

Findings should be interpreted in light of the study limitations. Some aspects of the study design could potentially limit the generalizability of these findings, such as: the exclusive reliance on self-report measures, the relatively low internal consistency of some scales, the focus on male participants only, and the cross-sectional design of the study. Moreover, as noted above, a number of unexpected null findings occurred, such that only few key aspects differentiated the offender and community samples, and only few emotion dysregulation facets were significant predictors of aggression in multiple regression analyses. Although this does not constitute a limitation per se, the inconsistency with some prior studies warrant further investigations in this area. For instance, participants in our offender sample presented a certain degree of heterogeneity in the severity of violence of their offenses, and this could have clouded some associations between study variables or unduly influenced group comparisons. Finally, it should be acknowledged that our focus on alexithymia, impulsivity, and emotion dysregulation is by no means exhaustive to understand the complexity of aggression. Many other constructs may contribute valuable information to understand aggressive tendencies (e.g., child

maltreatment, exposure to community violence, availability of weapon) and future studies should test the relative importance of these constructs compared to the constructs examined here.

Research Implications

Overall, our findings are consistent with the developmental framework presented above, according to which an ability to think about and reflect upon feelings creates the basis for emotion regulation and impulse control. These, in turn, may serve as protective factors toward destructive aggressive tendencies, channeling the natural aggression disposition toward adaptive goals (Fonagy, 2003, 2004). Thus, deficits in these abilities could explain why certain individuals are more prone to aggression (Fonagy, 2004). Although consistent with this theoretical approach to violence based on mentalization (Fonagy, 2003), future research with longitudinal design is warranted to further test the developmental trajectories described in this model. Another important step to deepen our understanding of the mechanisms linking alexithymia, emotion dysregulation, and impulsivity with aggression, would be to integrate different assessment methods within the same studies. Based on findings obtained with cross-sectional designs using self-reports, future research should attempt to extend current knowledge incorporating multi-informant and multi-method assessments, in order to subject extant knowledge to empirical test of its robustness and ecological validity. Relatedly, the use of multi-method assessment may allow to untangle state-dependent and trait-like deficits, to understand not only *how*, but also *when*, mentalization abilities collapse paving the way for aggression (Grych & Hamby, 2014).

Clinical and Policy Implications

Our findings strengthen those of prior studies, indicating the important role of deficits in the broader domain of self-regulation to understand aggressive tendencies. Of note, the current findings advance those of prior studies by suggesting that – notwithstanding the importance of all these components – interventions aimed at improving the ability to regulate negative emotions (including but not limited to anger; see Roberton et al., 2015) may be particularly relevant to reduce aggression effectively. The study findings support prior claims (Garofalo et al., 2016; Roberton et al., 2015) that interventions aimed at reducing aggression should include an emphasis on the ability to: acknowledge and identify feelings; accept emotions, especially when they are upsetting; control behavior when distressed; consider the short- and long-term consequences of one's actions on the self and on others; and to manage and direct attention to tasks at hand limiting potential

distractions. More broadly, in light of the interconnections between specific competences in these domains, such interventions should ideally adopt a more comprehensive focus aimed at enhancing the capacity to: describe and talk about feelings; tolerate distress as part of the pursuing of desired goals; rely on a wide array of emotion regulation strategies and be able to select the most appropriate ones depending on individual and contextual contingencies. However, according to the developmental model adopted here, interventions aimed at stimulating self-reflection may be the first step to enhance emotional and behavioral regulation and reduce aggression. In keeping with recent clinical studies (Daffern et al., 2013), this study results highlight that treatment efforts should be directed not only at reducing overt aggressive tendencies, but also at reducing the hostile cognitive style that likely characterizes offenders. A reduction in hostility has indeed been linked to lower rates of recidivism (Daffern et al., 2013), and our finding appear to suggests that such reduction might be related to an increased capacity to identify, describe, and accept emotions.

These findings should also be of interest for policy makers in the forensic mental health system. Indeed, the identification and awareness of potential treatment targets to reduce aggression in violent populations may not be enough. Directors of prisons and forensic psychiatric centers should ensure that treatment modules aimed at improving emotion regulation and related skills be provided to offenders and patients, and that sufficient clinical staff be recruited and equipped with appropriate training to conduct such modules effectively.

References

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*(1), 27-51. doi: 10.1146/annurev.psych.53.100901.135231

Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale: I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research, 38*(1), 23-32. doi: 10.1016/0022-3999(94)90005-1

Baskin-Sommers, A. R., Curtin, J. J., Larson, C. L., Stout, D., Kiehl, K. A., & Newman, J. P. (2012). Characterizing the anomalous cognition-emotion interactions in externalizing. *Biol Psychol, 91*(1), 48-58. doi: 10.1016/j.biopsycho.2012.05.001

Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. New York, NY: Mcgraw-Hill Book Company.

Bonanno, G. A., & Burton, C. L. (2013). Regulatory Flexibility: An Individual Differences Perspective on Coping and Emotion Regulation. *Perspect Psychol Sci, 8*(6), 591-612. doi: 10.1177/1745691613504116

Bousardt, A. M. C., Hoogendoorn, A. W., Noorthoorn, E. O., Hummelen, J. W., & Nijman, H. L. I. (2016). Predicting inpatient aggression by self-reported impulsivity in forensic psychiatric patients. *Criminal Behaviour and Mental Health, 26*(3), 161-173. doi: 10.1002/cbm.1955

Bressi, C., Taylor, G., Parker, J., Bressi, S., Brambilla, V., Aguglia, E., . . . Invernizzi, G. (1996). Cross validation of the factor structure of the 20-item Toronto Alexithymia Scale: An Italian multicenter study. *Journal of Psychosomatic Research, 41*(6), 551-559. doi: 10.1016/S0022-3999(96)00228-0

Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 63*(3), 452-459.

Coccaro, E. F. (1992). Impulsive aggression and central serotonergic system function in humans: An example of a dimensional brain-behavior relationship. *International Clinical Psychopharmacology, 7*(1), 3-12. doi: 10.1097/00004850-199200710-00001

Cyders, M. A., & Smith, G. T. (2008). Emotion-based dispositions to rash action: positive and negative urgency. *Psychological Bulletin, 134*(6), 807-828. doi: 10.1037/a0013341

Daffern, M., Thomas, S., Lee, S., Huband, N., McCarthy, L., Simpson, K., & Duggan, C. (2013). The impact of treatment on hostile-dominance in forensic psychiatric inpatients: relationships between change in hostile-dominance and recidivism following release from custody. *Journal of Forensic Psychiatry & Psychology, 24*(6), 675-687. doi: 10.1080/14789949.2013.834069

Davidson, R. J., Putnam, K. M., & Larson, C. L. (2000). Dysfunction in the neural circuitry of emotion regulation - A possible prelude to violence. *Science, 289*(5479), 591-594. doi: 10.1126/science.289.5479.591

Day, A. (2009). Offender emotion and self-regulation: implications for offender rehabilitation programming. *Psychology, Crime & Law, 15*(2-3), 119-130. doi: 10.1080/10683160802190848

Denissen, J., Thomaes, S., & Bushman, B. J. (2017). Self-Regulation and aggression: Aggression-provoking cues, individual differences, and self-control strategies. In D. de Ridder, M. Adriaanse & K. Fujita (Eds.), *Routledge international handbook of self-control in health and well-being*. London, UK: Routledge.

Derefinko, K., DeWall, C. N., Metze, A. V., Walsh, E. C., & Lynam, D. R. (2011). Do different facets of impulsivity predict different types of aggression? *Aggressive Behavior, 37*(3), 223-233. doi: 10.1002/ab.20387

Derogatis, L., & Melisaratos, N. (1983). The Brief Symtpom Inventory. An introductory report. *Psychological Medicine, 13*(3), 595-605.

Donahue, J. J., McClure, K. S., & Moon, S. M. (2014). The relationship between emotion regulation difficulties and psychopathic personality characteristics. *Personality Disorders: Theory, Research, and Treatment, 5*(2), 186-194. doi: 10.1037/per0000025

Edwards, E. R., & Wupperman, P. (2016). Emotion regulation mediates effects of alexithymia and emotion differentiation on impulsive aggressive behavior. *Deviant Behavior*. doi: 10.1080/01639625.2016.1241066

Elison, J., Garofalo, C., & Velotti, P. (2014). Shame and aggression: Theoretical considerations. *Aggression and Violent Behavior, 19*(4), 447-453. doi: 10.1016/j.avb.2014.05.002

Fonagy, P. (2003). Towards a developmental understanding of violence. *The British Journal of Psychiatry, 183*(3), 190-192. doi: 10.1192/bjp.183.3.190

Fonagy, P. (2004). The developmental roots of violence in the failure of mentalization. In F. Pfäfflin & G. Adshead (Eds.), *A Matter of Security*. London, UK: Jessica Kingsley.

Fossati, A., Acquarini, E., Feeney, J. A., Borroni, S., Grazioli, F., Giarolli, L. E., . . . Maffei, C. (2009). Alexithymia and attachment insecurities in impulsive aggression. *Attachment & Human Development, 11*(2), 165-182. doi: 10.1080/14616730802625235

Fossati, A., Barratt, E. S., Borroni, S., Villa, D., Grazioli, F., & Maffei, C. (2007). Impulsivity, aggressiveness, and DSM-IV personality disorders. *Psychiatry Research, 149*(1-3), 157-167. doi: 10.1016/j.psychres.2006.03.011

Fossati, A., Di Ceglie, A., Acquarini, E., & Barratt, E. S. (2001). Psychometric properties of an Italian version of the Barratt Impulsiveness Scale-11 (BIS-11) in nonclinical subjects. *Journal of Clinical Psychology, 57*(6), 815-828. doi: 10.1002/jclp.1051

Fossati, A., Maffei, C., Acquarini, E., & Di Ceglie, A. (2003). Multigroup Confirmatory Component and Factor Analyses of the Italian Version of the Aggression Questionnaire. *European Journal of Psychological Assessment, 19*(1), 54-65. doi: 10.1027//1015-5759.19.1.54

Garofalo, C., Holden, C. J., Zeigler-Hill, V., & Velotti, P. (2016). Understanding the Connection Between Self-Esteem and Aggression: The Mediating Role of Emotion Dysregulation. *Aggressive Behavior, 42*(1), 3-15. doi: 10.1002/ab.21601

Garofalo, C., & Velotti, P. (2017). Negative emotionality and aggression in violent offenders: The moderating role of emotion dysregulation. *Journal of Criminal Justice, 51*, 9-16. doi: 10.1016/j.jcrimjus.2017.05.015

Garofalo, C., & Wright, A. G. C. (2017). Alcohol abuse, personality disorders, and aggression: The quest for a common underlying mechanism. *Aggression and Violent Behavior, 34*, 1-8. doi: 10.1016/j.avb.2017.03.002

Giromini, L., Velotti, P., de Campora, G., Bonalume, L., & Zavattini, G. C. (2012). Cultural adaptation of the difficulties in emotion regulation scale: reliability and validity of an Italian version. *Journal of Clinical Psychology, 68*(9), 989-1007. doi: 10.1002/jclp.21876

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41-54. doi: 10.1023/b:joba.0000007455.08539.94

Gratz, K. L., Rosenthal, M. Z., Tull, M. T., Lejuez, C. W., & Gunderson, J. G. (2006). An experimental investigation of emotion dysregulation in borderline personality disorder. *Journal of Abnormal Psychology, 115*(4), 850-855. doi: 10.1037/0021-843X.115.4.850

Grych, J., & Hamby, S. (2014). Advancing the measurement of violence: Challenges and opportunities. *Psychology of Violence, 4*(4), 363-368. doi: 10.1037/a0037886

Hamby, S., McDonald, R., & Grych, J. (2014). Trends in Violence Research: An Update Through 2013. *Psychology of Violence, 4*(1), 1-7. doi: 10.1037/a0035384

Hamilton, K. R., Littlefield, A. K., Anastasio, N. C., Cunningham, K. A., Fink, L. H., Wing, V. C., . . . Potenza, M. N. (2015). Rapid-response impulsivity: definitions, measurement issues, and clinical implications. *Personality Disorders: Theory, Research, and Treatment, 6*(2), 168-181. doi: 10.1037/per0000100

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Hecht, L. K., & Latzman, R. D. (2015). Revealing the nuanced associations between facets of trait impulsivity and reactive and proactive aggression. *Personality and Individual Differences, 83*, 192-197. doi: 10.1016/j.paid.2015.04.021

Hornsveld, R. H. J., & Kraaimaat, F. W. (2012). Alexithymia in Dutch violent forensic psychiatric outpatients. *Psychology, Crime & Law, 18*(9), 833-846. doi: 10.1080/1068316x.2011.568416

Keltikangas-Järvinen, L. (1982). Alexithymia in violent offenders. *Journal of Personality Assessment, 46*(5), 462-467. doi: 10.1207/s15327752jpa4605_3

Keulen-de Vos, M. E., Bernstein, D. P., Vanstipelen, S., de Vogel, V., Lucker, T. P. C., Slaats, M., . . . Arntz, A. (2016). Schema modes in criminal and violent behaviour of forensic cluster B PD patients: A retrospective and prospective study. *Legal and Criminological Psychology, 21*(1), 56-76. doi: 10.1111/lcrp.12047

Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior and personality: Modeling the externalizing spectrum. *Journal of Abnormal Psychology, 111*(3), 411-424. doi: 10.1037/0021-843x.111.3.411

Levenson, R. W. (1999). The intrapersonal functions of emotion. *Cognition and Emotion, 13*(5), 481-504. doi: 10.1080/026999399379159

Lynam, D. R., & Miller, J. D. (2004). Personality Pathways to Impulsive Behavior and Their Relations to Deviance: Results from Three Samples. *Journal of Quantitative Criminology, 20*(4), 319-341. doi: 10.1007/s10940-004-5867-0

Manninen, M., Therman, S., Suvisaari, J., Ebeling, H., Moilanen, I., Huttunen, M., & Joukamaa, M. (2011). Alexithymia is common among adolescents with severe disruptive behavior. *Journal of Nervous and Mental Disease, 199*(7), 506-509. doi: 10.1097/NMD.0b013e3182214281

Miller, J. D., Zeichner, A., & Wilson, L. F. (2012). Personality correlates of aggression: evidence from measures of the five-factor model, UPPS model of impulsivity, and BIS/BAS. *Journal of Interpersonal Violence, 27*(14), 2903-2919. doi: 10.1177/0886260512438279

Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *The American Journal of Psychiatry, 158*(11), 1783-1793. doi: 10.1176/appi.ajp.158.11.1783

Nagin, D. S., & Tremblay, R. E. (2001). Parental and early childhood predictors of persistent physical aggression in boys from kindergarten to high school. *Archives of General Psychiatry, 58*(4), 389-394. doi: 10.1001/archpsyc.58.4.389

Nemiah, J. C., & Sifneos, P. E. (1970). Psychosomatic illness: A problem in communication. *Psychotherapy and Psychosomatics, 18*(1-6), 154-160. doi: 10.1159/000286074

Nestor, P. G. (2002). Mental disorder and violence: Personality dimensions and clinical features. *American Journal of Psychiatry, 159*(12), 1973-1978. doi: 10.1176/appi.ajp.159.12.1973

Nicoll, M., & Beail, N. (2013). A Comparison of Anger in Offenders and Non-Offenders Who have Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities, 26*(5), 466-470. doi: 10.1111/jar.12035

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51*(6), 768-774. doi: 10.1002/1097-4679(199511)51:6<768::AID-JCLP2270510607>3.0.CO;2-1

Perley-Robertons, B., Helmus, L. M., Derkzen, D., & Serin, R. (2016). Do Sex Offenders Against Adults, Sex Offenders Against Children, and Non-sex Offenders Differ in Impulsivity? *Sexual Offender Treatment, 11*(2).

Pond, R. S., Jr., Kashdan, T. B., DeWall, C. N., Savostyanova, A., Lambert, N. M., & Fincham, F. D. (2012). Emotion differentiation moderates aggressive tendencies in angry people: A daily diary analysis. *Emotion, 12*(2), 326-337. doi: 10.1037/a0025762

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891. doi: 10.3758/brm.40.3.879

Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods, 16*(2), 93-115. doi: 10.1037/a0022658

Roberton, T., Daffern, M., & Bucks, R. S. (2012). Emotion regulation and aggression. *Aggression and Violent Behavior, 17*(1), 72-82. doi: 10.1016/j.avb.2011.09.006

Roberton, T., Daffern, M., & Bucks, R. S. (2014). Maladaptive emotion regulation and aggression in adult offenders. *Psychology, Crime & Law, 20*(10), 933-954. doi: 10.1080/1068316x.2014.893333

Roberton, T., Daffern, M., & Bucks, R. S. (2015). Beyond anger control: Difficulty attending to emotions also predicts aggression in offenders. *Psychology of Violence, 5*(1), 74-83. doi: 10.1037/a0037214

Schmidt, C. A., Fallon, A. E., & Coccaro, E. F. (2004). Assessment of behavioral and cognitive impulsivity: development and validation of the Lifetime History of Impulsive Behaviors Interview. *Psychiatry Research, 126*(2), 107-121. doi: 10.1016/j.psychres.2003.12.021

Scott, J. P., DiLillo, D., Maldonado, R. C., & Watkins, L. E. (2015). Negative urgency and emotion regulation strategy use: Associations with displaced aggression. *Aggressive Behavior, 41*(5), 502-512. doi: 10.1002/ab.21588

Scott, L. N., Stepp, S. D., & Pilkonis, P. A. (2014). Prospective associations between features of borderline personality disorder, emotion dysregulation, and aggression. *Personality Disorders: Theory, Research, and Treatment, 5*(3), 278-288. doi: 10.1037/per0000070

Seroczynski, A. D., Bergeman, C. S., & Coccaro, E. F. (1999). Etiology of the impulsivity/aggression relationship: Genes or environment? *Psychiatry Research, 86*(1), 41-57. doi: 10.1016/S0165-1781(99)00013-X

Strickland, J., Parry, C. L., Allan, M. M., & Allan, A. (2017). Alexithymia among Perpetrators of Violent Offences in Australia: Implications for Rehabilitation. *Australian Psychologist, 52*(3), 230-237. doi: 10.1111/ap.12187

Tamir, M. (2011). The Maturing Field of Emotion Regulation. *Emotion Review, 3*(1), 3-7. doi: 10.1177/1754073910388685

Teten, A. L., Miller, L. A., Bailey, S. D., Dunn, N. J., & Kent, T. A. (2008). Empathic deficits and alexithymia in trauma-related impulsive aggression. *Behavioral Sciences & the Law, 26*(6), 823-832. doi: 10.1002/bsl.843

Tonnaer, F., Cima, M., & Arntz, A. (2016). Executive (dys)functioning and impulsivity as possible vulnerability factors for aggression in forensic patients. *Journal of Nervous and Mental Disease, 204*(4), 280-286. doi: 10.1097/NMD.0000000000000485

Velotti, P., Elison, J., & Garofalo, C. (2014). Shame and aggression: Different trajectories and implications. *Aggression and Violent Behavior, 19*(4), 454-461. doi: 10.1016/j.avb.2014.04.011

Velotti, P., Garofalo, C., Callea, A., Bucks, R. S., Roberton, T., & Daffern, M. (2016). Exploring anger among offenders: The role of emotion dysregulation and alexithymia. *Psychiatry, Psychology and Law*. doi: 10.1080/13218719.2016.1164639

Velotti, P., Garofalo, C., Petrocchi, C., Cavallo, F., Popolo, R., & Dimaggio, G. (2016). Alexithymia, emotion dysregulation, impulsivity and aggression: A multiple mediation model. *Psychiatry Research*. doi: 10.1016/j.psychres.2016.01.025

Winer, E. S., Cervone, D., Bryant, J., McKinney, C., Liu, R. T., & Nadorff, M. R. (2016). Distinguishing mediational models and analyses in clinical psychology: Atemporal associations do not imply causation. *Journal of Clinical Psychology*. doi: 10.1002/jclp.22298

Zavattini, G. C., Garofalo, C., Velotti, P., Tommasi, M., Romanelli, R., Espírito-Santo, H., . . . Saggino, A. (2017). Dissociative experiences and psychopathology among inmates in Italian and Portuguese prisons. *International Journal of Offender Therapy and Comparative Criminology, 61*(9), 975-992. doi: 10.1177/0306624X15617256

Table 1
Sociodemographic characteristics of the offender (N = 221) and community (N = 245) samples.

	Offenders	Community
City of residence	*N(%)*	*N(%)*
Big city (more than 100.000 inhabitants)	113(51.1)	84(34.3)
Medium city (between 10.000 and 100.000 inhabitants)	53(24)	123(50.2)
Small city (less than 10.000 inhabitants)	38(17.2)	31(12.7)
Did not report	17(7.7)	7(2.8)
Educational level		
Primary school	18(8.1)	6(2.4)
Middle school	104(47.1)	35(14.3)
High school	80(36.2)	123(50.2)
University degree	7(3.3)	80(32.7)
Did not report	2(1)	12(4.9)
Annual income		
Less than 36.000€	152(68.8)	179(73.1)
Between 36.000 and 70.000€	7(3.2)	50(20.4)
More than 70.000€	3(1.4)	5(2)
No income declared	59(26.7)	11(4.5)
Civil status		
Single	74(33.5)	65(26.5)
Married	43(19.5)	95(38.8)
In a relationship	44(20)	64(26.1)

	Divorced	43(19.5)	17(7)
	Widower	7(3.2)	1(0.4)
	Did not report	10(4.5)	3(1.2)
Children			
	No	91(41.2)	133(54.3)
	One	51(23.1)	48(19.6)
	Two	44(19.9)	55(22.4)
	Three or more	28(12.7)	7(2.9)
	Did not report	7(3.2)	2(0.8)

Table 2

Mean, standard deviation (SD), and group comparisons (community sample, N = 245; offender sample, N = 221) for all study variables.

	Comunity	Offender	ANCOVA/MANCOVA	Effect size
	M(SD)	*M(SD)*	*F*	η^2_p
TAS-20 total	43.7 (10.5)	45.4 (12.6)	$F(1,462) = 2.91$	$\eta^2_p = .01$
TAS-20 DIF	11.7 (4.9)	13.6 (6.4)	$F(1,457) = 14.53^{***}$	$\eta^2_p = .03$
TAS-20 DDF	12.2 (4.5)	11.8 (4.9)	$F(1,457) = .15$	$\eta^2_p = .01$
TAS-20 EOT	19.8 (4.7)	20.0 (5.1)	$F(1,457) = .20$	$\eta^2_p = .00$
BIS-11 total	60.9 (10.4)	59.9 (11.3)	$F(1,461) = .43$	$\eta^2_p = .00$
BIS-11 Motor	20.9 (4.3)	20.9 (5.3)	$F(1,460) = .23$	$\eta^2_p = .00$
BIS-11 Attention	15.3 (3.7)	14.8 (3.6)	$F(1,460) = .13$	$\eta^2_p = .00$
BIS-11 Non Plan	24.9 (4.9)	24.2 (5.2)	$F(1,460) = 1.9$	$\eta^2_p = .00$
DERS total	72.6 (19.0)	72.0 (19.3)	$F(1,461) = .05$	$\eta^2_p = .00$
DERS Nonacceptance	11.43 (4.4)	12.9 (5.3)	$F(1,461) = 10.07^{**}$	$\eta^2_p = .02$
DERS Goals	12.18 (4.4)	11.4 (4.2)	$F(1,456) = 2.67$	$\eta^2_p = .01$
DERS Negative Urgency	10.8 (4.3)	10.7 (4.4)	$F(1,456) = .03$	$\eta^2_p = .00$
DERS Awareness	14.6 (4.4)	14.1 (3.8)	$F(1,456) = 1.50$	$\eta^2_p = .00$
DERS Strategies	14.3 (5.8)	14.2 (5.7)	$F(1,456) = .06$	$\eta^2_p = .00$
DERS Clarity	9.3 (3.9)	8.7 (3.3)	$F(1,456) = 3.50$	$\eta^2_p = .01$
AQ total	66.8 (17.2)	71.6 (18.2)	$F(1,462) = 12.15^{**}$	$\eta^2_p = .03$
AQ Physical Aggression	18.3 (6.4)	20.5 (7.3)	$F(1,460) = 14.00^{***}$	$\eta^2_p = .03$
AQ Verbal Aggression	15.0 (3.7)	14.7 (3.7)	$F(1,460) = .80$	$\eta^2_p = .00$
AQ Anger	15.7 (5.3)	16.3 (5.7)	$F(1,460) = 3.00$	$\eta^2_p = .01$
AQ Hostility	17.7 (5.9)	20.1 (6.4)	$F(1,460) = 21.11^{***}$	$\eta^2_p = .04$

GSI	.50 (.52)	.70 (.65)	$F(1,462) = 15.60^{***}$	$\eta^2_p = .03$

Nota. TAS-20 = Toronto Alexithymia Scale-20. DIF = Difficulty Identifying Feelings. DDF = Difficulty Describing Feelings. EOT = External Oriented Thinking. BIS-11 = Barratt Impulsiveness Scale-11. Motor = Motor Impulsivity. Attention = Attentional Impulsivity. Non-Plan = Non-Planning Impulsivity. DERS = Difficulties in Emotion Regulation Scale. AQ = Aggression Questionnaire. GSI = Global Severity Index from the Brief Symtpom Inventory. η^2_p = Partial Eta-Squared. TAS-20 MANCOVA $F(3,455) = 7.74$, Wilks' $\lambda = .95$, $p < .001$, $\eta^2_p = .05$. BIS-11 MANCOVA $F(3,458) = 1.10$, Wilks' $\lambda = .99$, $p > .05$, $\eta^2_p = .01$. DERS MANCOVA $F(6,451) = 5.80$, Wilks' $\lambda = .93$, $p < .001$, $\eta^2_p = .07$. AQ MANCOVA $F(4,457) = 10.52$, Wilks' $\lambda = .92$, $p < .001$, $\eta^2_p = .08$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Bivariate associations among study variables in the offender (N = 221; below the diagonal) and community (N = 245; above the diagonal) samples.

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
DERS	1. Nonacceptance	—	**.49**	**.58**		**.66**	**.40**	**.36**	**.34**	.15	**.35**	**.26**	.21	.20	.19	**.39**	**.53**
	2. Goals	**.57**	—	**.61**		**.56**	**.28**	**.32**	**.31**	.13	**.36**	.19	.22	**.23**	.16	**.34**	**.38**
	3. Negative Urgency	**.52**	**.68**	—		**.69**	**.45**	**.42**	**.34**	**.24**	**.42**	**.38**	**.40**	**.50**	**.28**	**.62**	**.52**
	4. Awareness			.19	—		**.46**	**.31**	**.26**	**.32**		.20	**.29**				
	5. Strategies	**.62**	**.59**	**.71**		—	**.43**	**.37**	**.36**	.16	**.42**	**.26**	**.27**	**.32**	.20	**.44**	**.60**
	6. Clarity	**.42**	**.45**	**.49**	**.30**	**.46**	—	**.51**	**.45**	**.23**	**.33**	**.25**	**.28**	.20		.22	**.27**
TAS-20	7. DIF	**.57**	**.44**	**.52**		**.54**	**.44**	—	**.50**	**.23**	.22	.18	.22	**.27**		**.32**	**.33**
	8. DDF	**.41**	**.37**	**.41**		**.42**	**.43**	**.60**	—	**.30**	**.30**		.21	.18		**.27**	**.31**
	9. EOT	.17	**.31**	**.30**	**.28**	**.25**	.20	**.27**	**.28**	—	**.24**		**.43**	.18		.15	.13
BIS-11	10. Attention	**.40**	**.49**	**.49**	.13	**.48**	**.37**	**.46**	**.43**	**.24**	—	**.51**	**.45**	**.31**	**.26**	**.38**	**.34**
	11. Motor	**.38**	**.48**	**.46**		**.41**	**.31**	**.40**	**.33**	**.29**	**.59**	—	**.46**	**.30**	.18	**.34**	.19
	12. Non Plan	.21	**.37**	**.31**	**.38**	**.32**	**.32**	.17	.21	**.30**	**.33**	**.44**	—	**.23**		.22	
AQ	13. Physical aggression	**.24**	**.32**	**.49**	.15	**.30**	**.25**	**.27**	.20	.20	**.29**	**.45**	**.26**	—	**.45**	**.68**	**.43**
	14. Verbal aggression		.15	.19								.16		**.42**	—	**.59**	**.41**
	15. Anger	**.44**	**.47**	**.53**		**.42**	**.33**	**.39**	**.30**	.18	**.45**	**.47**	**.24**	**.66**	**.43**	—	**.59**
	16. Hostility	**.47**	**.35**	**.36**		**.42**	**.24**	**.44**	**.36**		**.38**	**.33**		**.41**	**.34**	**.58**	—

Nota. DERS = Difficulties in Emotion Regulation Scale. TAS-20 = Toronto Alexithymia Scale-20. DIF = Difficulty Identifying Feelings. DDF = Difficulty Describing Feelings. EOT = External Oriented Thinking. BIS-11 = Barratt Impulsiveness Scale-11. Motor = Motor Impulsivity. Attention = Attentional Impulsivity. Non Plan = Non-Planning Impulsivity. AQ = Aggression Questionnaire. For ease of presentation, only significant coefficients ($p < .05$) are reported. In the community sample, values of $r \geq .18$ are significant at the $p < .01$ level, and values of $r \geq .22$ are significant at the $p < .001$ level. In the offender sample, values of $r \geq .18$ are significant at the $p < .01$ level, and values of $r \geq .24$ are significant at the $p < .001$ level. Significant correlation coefficients that would survive Bonferroni adjustment for multiple testing (i.e., $p < .0004$) are reported in bold typeface.

Table 4

Hierarchical multiple regression analyses assessing the independent contribution of alexithymia, impulsivity, and emotion dysregulation facets in predicting aggression dimensions.

		Offender sample (N = 221)				Community sample (N = 245)			
		Physical Aggression	Verbal Aggression	Anger	Hostility	Physical Aggression	Verbal Aggression	Anger	Hostility
Step	Predictors	β	β	β	β	β	β	β	β
1	TAS-20 DIF	.21*		.31***	.38***	.22**		.24**	.23**
	TAS-20 DDF				.16*				.18*
	TAS-20 EOT								
	$R^2_{adjusted}$	**.08*** **	***ns***	**.15*** **	**.19*** **	**.07*** **	***ns***	**.11*** **	**.12*** **
2	BIS-11 Motor	.38***		.27**		.18*		.20**	
	BIS-11 Attention			.19*	.17*	.16*	.26**	.22**	..27***
	BIS-11 Non Plan						-.18*		
	$R^2_{adjusted}$	**.20*** **	***ns***	**.27*** **	**.23*** **	**.14*** **	**.08*** **	**.21*** **	**.18*** **
	ΔR^2	**.13*** **	***ns***	**.13*** **	**.05** **	**.08*** **	**.08*** **	**.11*** **	**.06** **
3	DERS Nonacceptance			.17*	.21*				.18*
	DERS Goals								
	DERS Neg. Urgency	.50***		.27**		.56***	.32**	.60***	.18*
	DERS Awareneness								
	DERS Strategies								.35***
	DERS Clarity							-.16*	
	$R^2_{adjusted}$	**.29*** **	***ns***	**.34*** **	**.27*** **	**.28*** **	**.11*** **	**.41*** **	**.41*** **
	ΔR^2	**.11*** **	***ns***	**.09*** **	**.06** **	**.15*** **	**.05***	**.21*** **	**.24** **
	Cohen's f^2	**.49**		**.61**	**.45**	**.39**	**.12**	**.69**	**.69**

Nota. TAS-20 = Toronto Alexithymia Scale-20. DIF = Difficulty Identifying Feelings. DDF = Difficulty Describing Feelings. EOT = External Oriented Thinking. BIS-11 = Barratt Impulsiveness Scale-11. Motor = Motor Impulsivity. Attention = Attentional Impulsivity. Non-Plan = Non-Planning Impulsivity. DERS = Difficulties in Emotion Regulation Scale. For ease of presentation, only significant results are reported.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5

Summary of multiple mediation analysis for alexithymia, emotion dysregulation, impulsivity and aggression in the offender sample (N = 221; 5,000 bootstraps).

Independent variable (IV)	Mediator (M)	Dependent variable (DV)	Effect of M on DV (b)	Direct effect (c')	Indirect effect (bias-corrected CI) (a)(b): 95% CI	Total effect (c)	Effect sizes (ab_{cs})	Indirect effect comparisons
	DERS		.09*		.09: .01, .17		.15	
Alexithymia		Physical Aggr.		.00		.17***		Δ = .00; -.11, .11
	BIS-11		.19***		.09: .04, .15		.15	
	DERS		.12***		.12: .07, .18		.27	
Alexithymia		Anger		.00		.17***		Δ = .07; .01, .15
	BIS-11		.11**		.05: .02, .09		.11	
	DERS		.09**		.09: .03, .16		.18	
Alexithymia		Hostility		.11**		.22***		Δ = .08; -.01, .17
	BIS-11		.02		.01: -.03, .05		.02	

DERS = Difficulties in Emotion Regulation Scale. BIS-11 = Barratt Impulsiveness Scale-11. CI = Confidence Interval. ab_{cs} = completely standardized indirect effect (.01 = small effect size; .09 = medium effect size; .25 = large effect size; Preacher and Kelley, 2011). Effects of IV on M: .99 (for DERS), .45 (for BIS-11), *p*s < .001.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Nota.

Table 6

Summary of multiple mediation analysis for alexithymia, emotion dysregulation, impulsivity and aggression in the community sample (N = 245; 5,000 bootstraps).

Independent variable (IV)	Mediator (M)	Dependent variable (DV)	Effect of M on DV (b)	Direct effect (c')	Indirect effect (bias-corrected CI) (a)(b): 95% CI	Total effect (c)	Effect sizes (ab_{cs})	Indirect effect comparisons
	DERS		.08**		.08: .01, .17		.14	
Alexithymia		Physical Aggr.		.03		.17***		Δ = .04; -..06, .14
	BIS-11		.12**		.05: .01, .10		.08	
	DERS		.04**		.05: .01, .08		.13	
Alexithymia		Verbal Aggr.		-.02		.03		Δ = .04; -.02, .08
	BIS-11		.03		.01: -.01, .04		.03	
	DERS		.11***		.11: .07, .18		.23	
Alexithymia		Anger		.02		.17***		Δ = .08; .01, .16
	BIS-11		.09*		.03: .01, .16		.06	
	DERS		.18**		.19: .12, .26		.33	
Alexithymia		Hostility		.02		.19***		Δ = .19; .12, .29
	BIS-11		-.03		-.01: -.05, .01		.02	

Nota.

DERS = Difficulties in Emotion Regulation Scale. BIS-11 = Barratt Impulsiveness Scale-11. CI = Confidence Interval. ab_{cs} = completely standardized indirect effect (.01 = small effect size; .09 = medium effect size; .25 = large effect size; Preacher and Kelley, 2011). Effects of IV on M:1.06 (for DERS), .38 (for BIS-11), *p*s < .001.

* $p < .05$. ** $p < .01$. *** $p < .001$.